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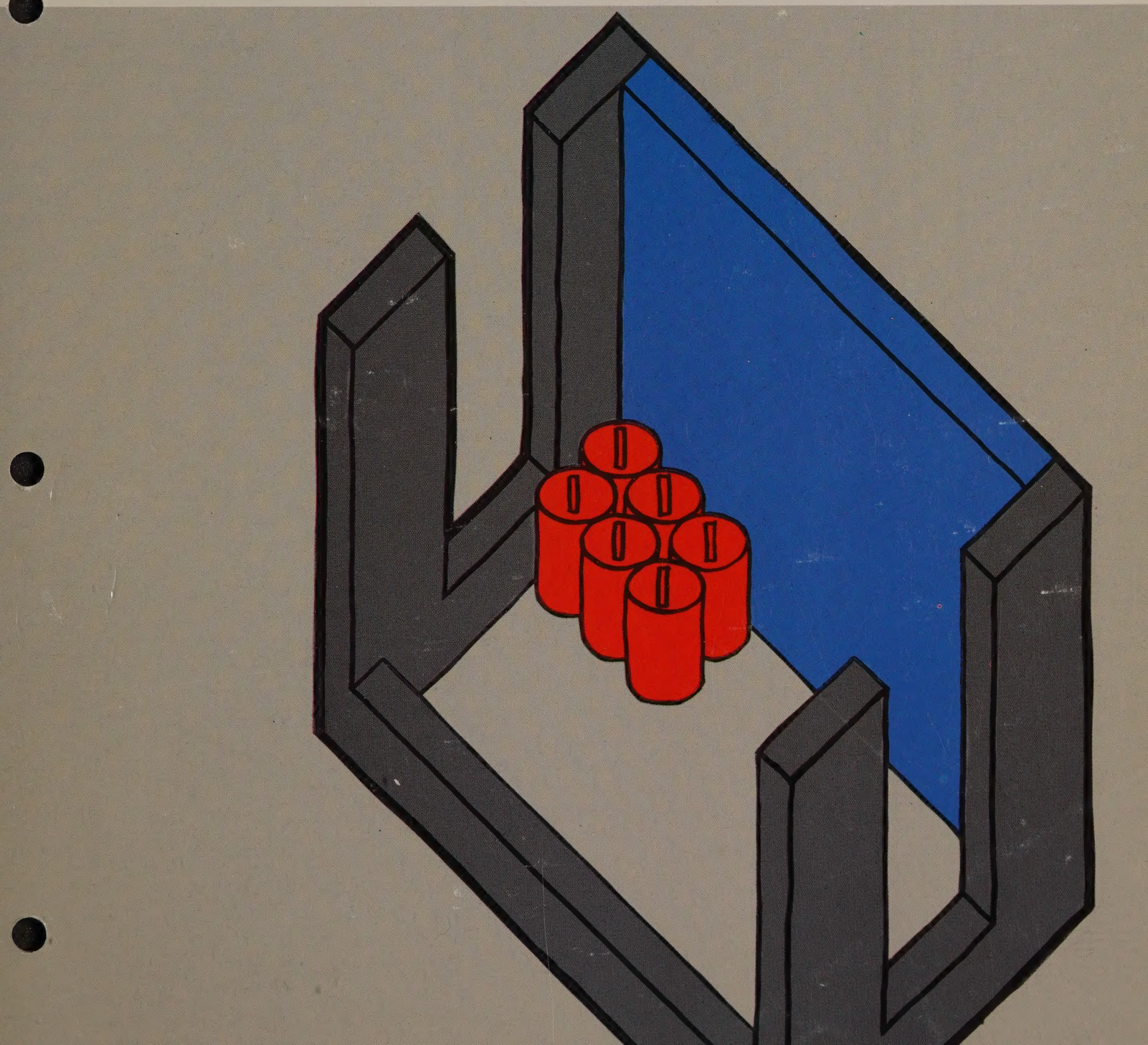
Department of Health and Social Security
and the Welsh Office

Fire
Practice
Note 2

FIRECODE

Storage of Flammable Liquids



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FIRECODE

Storage of Flammable Liquids

London Her Majesty's Stationery Office

ISBN 0 11 321111 2

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First published 1987

FIRECODE brings together in one comprehensive suite of documents the Department's policy and technical guidance on fire precautions in hospitals and other NHS premises.

Basic policy, principles and key management guidance are contained in *Firecode: Policy and Principles.* Other *FIRECODE* documents include the *Health Technical Memoranda* '80' series (which give technical guidance on various building, engineering and equipment issues) and the *Fire Practice Notes* series (dealing with various specialist aspects of fire precautions) and Nucleus guidance. Existing HTMs will, in due course, be reissued in *FIRECODE* format. The suite includes *Firecode: Directory of Fire Documents* which lists references to relevant legislation and relevant fire precautions guidance issued by non-DHSS sources (as, for example, the Home Office).

For the convenience of the user, a *FIRECODE* binder and slip case are available for the storage of the constituent *FIRECODE* documents. The binder includes details of the publications which make up *FIRECODE.*
The *FIRECODE* binder, reference ISBN 0 11 321097 3, is available from HMSO Books, PO Box 276, Nine Elms Lane, London SW8 5DT.

Fire Practice Note 2
Storage of flammable liquids

Contents

	Page No
I. Introduction	3
II. Regulations and Definitions	4
III. Storage Standards	5
Flammable liquids	
Existing flammable liquid stores	
Storage of petrol	
Storage of fuel oil	
IV. Additional Requirements for Fire Safety	6
Fire alarms	
Automatic fire detection	
Fire fighting	
Electrical equipment	
Means of escape	
Marking	
V. References	8

1. Introduction

1.1 This Fire Practice Note (FPN) is referred to in Appendix 6 of HTM 81 [1]. It provides guidance on the storage of flammable liquids on health service premises. It should be read in conjunction with Health and Safety Executive Guidance Note CS2 [2].

1.2 This FPN supersedes the advice given in Health Technical Memorandum (HTM) 16 on the storage of highly flammable liquids.

1.3 Adequate attention should be paid to fire safety from the outset of new projects and upgradings. The planning and design of flammable liquid stores should be in accordance with HTM 81, in particular attention is drawn to Sections 3, 4, 5 and 6 of HTM 81 concerning statutory regulations, including the Fire Precautions Act and Building Regulations, consultation procedures and fire separation.

1.4 Flammable liquid stores should comply with the Home Office's Guides to the Fire Precautions Act 1971, No 2 - Factories [3] (referred to in this FPN as the Home Office Guide). For the purpose of the Home Office Guide, the flammable liquid store should be classified as "high risk". A fire certificate may be required in respect of the store; see FIRECODE [4] section 2 and HTM 81 clause 3.1.

1.5 All flammable liquids pose a fire/explosion risk and must be stored safely. The quantities of any flammable liquids kept in departments ready for immediate use should be as small as is reasonably practicable having regard to the processes or operations being carried on.

1.6 Liquids defined as highly flammable by the Highly Flammable Liquids and Liquified Petroleum Gases Regulations 1972 [5] are particularly hazardous and must be stored and used in accordance with the Regulations. Up to 50 litres of such substances may be stored in a workroom provided they are kept in metal bins or cupboards which are fire resisting structures. Larger quantities must be stored in either bulk tanks or portable containers kept in open compounds, or in suitable storerooms. The regulations do not prescribe storage requirements for less than 500cc of highly flammable liquid, provided the vessel is small, closed and suitable for the purpose.

1.7 General guidance on the safe use of flammable liquids is given in HTM 83 [6] and in FPA Guide to safe practice with flammable liquids [7].

1.8 Guidance on the storage of gas cylinders is given in WKO(85)1 [8].

II. Regulations and Definitions

2.1 Except where otherwise defined, the term flammable liquid in this FPN means any liquid with a flash point of less than 55°C, but not petrol which is covered by separate legislation.

2.2 The Highly Flammable Liquids and Liquified Petroleum Gases Regulations 1972 [5] (hereinafter referred to as "The Regulations") define highly flammable liquids as liquids having a flash point of less than 32°C (as measured by the Abel closed cup method). For example, many adhesives, polishes, paints and thinners in use by works departments contain solvents of this nature. Some emulsions and suspensions are included and many of the liquids used in medical departments, laboratories and laundries fall within the definition.

2.3 The Regulations are directly applicable to "factory" areas within NHS premises, but they also provide a guide to standards of compliance with the requirements of sections 2, 3 and 4 of the Health and Safety at Work etc Act 1974 [9] and are thus relevant wherever highly flammable liquids (and liquified petroleum gases) are used or stored in the NHS. The Regulations do not apply to storage of petroleum mixtures with flash points of less than 23°C which should be kept in accordance with the Petroleum (Consolidation) Act 1928 [10] as extended by Orders in Council (see paragraph 3.4).

2.4 Although flammable liquids with flash points of 32°C and above, for example white spirit and turpentine, are not subject to the Regulations, they nevertheless pose a fire risk. Whilst such liquids do not give off an ignitable vapour at ordinary ambient temperatures, they are capable of spreading and intensifying any fire in which they are involved. To ensure compliance with the Health and Safety at Work etc Act 1974 all such liquids must be stored safely and it is recommended that they are stored to the standard required by the Regulations for highly flammable liquids. This should avoid any need for a separate standard and it is envisaged that in practice all flammable liquids could conveniently be stored together. This amends the advice given in HTM 83 [6], paragraph 5.28, that highly flammable liquids should be stored alone.

2.5 All flammable liquids should be kept in suitable containers and clearly labelled. Containers used for highly flammable liquids should be marked as required by the Regulations.

2.6 Where there is any doubt concerning the flammability of a substance, the manufacturer or supplier should be consulted.

III. Storage Standards

Flammable liquids

3.1 Health and Safety Executive Guidance Note CS2 [2] contains comprehensive guidance on the design, operation and maintenance of installations used for the safe storage of highly flammable liquids. Although written specifically to cover substances defined as highly flammable liquids, it is recommended that the same standard of storage is applied wherever flammable liquids are stored (see paragraph 2.4).

3.2 Relatively small quantities of flammable liquids are normally required by hospital departments and paragraphs 40 to 55 of Guidance Note CS2, which are concerned with the storage of liquids in portable containers including drums and cans, are likely to be particularly relevant.

Existing flammable liquid stores

3.3 Existing installations should be upgraded where necessary to ensure that compliance with this FPN is achieved so far as is reasonably practicable. Stores for highly flammable liquids which were designed in accordance with HTM 16 will often still be accepted as satisfactory. Where there is any doubt concerning the safety of an installation, or where there is difficulty in complying fully with Guidance Note CS2, the local Health and Safety Executive Inspector should be consulted.

Storage of petrol

3.4 The keeping of petroleum spirit, calcium carbide, petroleum mixtures (such as certain paints and glues) and liquid methane, is regulated by the Petroleum (Consolidation) Act 1928 as extended by Orders in Council. Health authorities who keep such substances must apply for a licence from their local Petroleum Licensing Authority (eg County Council or Fire or Civil Defence Authority).

Storage of fuel oil

3.5 Fuel oil should be stored in accordance with the recommendations of BS 5410: Part 2 [11].

IV. Additional Requirements for Fire Safety

Fire alarms

4.1 Automatic fire detection will normally be essential for flammable liquid stores which form part of occupied health buildings. Stores will usually be unoccupied for long periods and flammable liquid fires develop quickly and burn fiercely. An automatic means of detecting the outbreak of fire and raising the alarm will enable prompt action to be taken to attack the fire and permit safe evacuation of adjoining areas where necessary. Manual call points should also be provided to enable anyone present to raise the alarm.

4.2 Where flammable liquids are stored in a separate building, or in an open compound, deemed to be in a safe position where a fire in the store will not endanger occupied areas, the cost of a fire detection system can be balanced directly against the estimated value of probable loss. As well as the loss of the storage building or compound itself and its contents, account should be taken of the possible disruption to the service the loss of those contents would cause.

Automatic detection - choice of detector

4.3 Flammable liquid fires burn rapidly and there is a negligible interval between ignition and a fierce fire. It is essential that if automatic fire detection is provided and is to be effective, either in giving warning of fire or initiating automatic fire suppression as well (see paragraph 4.10), it should give the earliest practicable response to a fire.

4.4 Flammable liquid fires develop immense heat when burning and a heat detector will often operate before a smoke detector. Indeed, some liquids, for example alcohol, emit little, if any, smoke when burning and therefore render a smoke detector ineffective unless other liquids or combustible materials also become involved in the fire. In general, heat detection will be preferable to smoke detection in flammable liquid storage buildings.

4.5 Flame detectors may in some cases be faster than heat or smoke detectors in responding to liquid fires. However, flame detectors need a direct line of sight to the fire which may be obstructed by storage racks or containers. In outside storage areas where heat and smoke from a fire will not be contained by a storage building, flame detection may be the only automatic means of effective fire detection.

4.6 Where cellulose liquids, for example some paints and thinners, are stored ionisation type smoke detectors, which are very sensitive to fresh cellulosic smoke are likely to give the earliest warning of fire and may be preferred.

4.7 Further guidance on fire alarms and automatic fire detection in health buildings is given in HTM 82 [12].

Fire fighting

4.8 Adequate hand operated appliances of the appropriate type should be provided and sited so as to be readily accessible for use in the flammable liquid store (and in all places where flammable liquids are used and handled). General guidance on the selection of fire extinguishers is given in HTM 83 [6]; more detailed guidance is to be found in BS 5306 Part 3 [13].

4.9 As far as is practicable the layout of racking and positioning of containers within the store should be arranged to facilitate access for fire fighting and ensure safe means of escape. Storage should not be piled up or racked so high as to be difficult to reach with fire fighting equipment.

4.10 Consideration should be given to the provision of an automatic extinguishing system. Such a system may be necessary where the store is integral with other departments and could pose a threat to the occupants, and may be justifiable economically for larger stores using the rationale of paragraph 4.2. Guidance on the selection of appropriate extinguishing systems is given in BS 5306 : Part 0 [13].

4.11 Foam inlets may be necessary where stores are within the main hospital and fire fighting access is restricted. The advice of the fire authority should be sought. The specific requirements for foam inlets are given in BS 5306 : Part 1 [13].

4.12 Fuel oil tanks may require automatic fire extinguishing systems and/or foam inlets; see HTM 81 [1] and BS 5410 Part 2 [11].

4.13 Fire extinguishing systems and equipment should be in accordance with the relevant part(s) of BS 5306 [13]. Gas flooding fire extinguishing systems should additionally comply with Health and Safety Executive Guidance Note GS16 [14].

4.14 Where an automatic extinguishing system is provided, it should be connected to the fire alarm system of the building. The fire detection elements of the automatic extinguishing system will replace some, or all, of any fire detectors that would otherwise be installed to satisfy paragraphs 4.1 and 4.2.

Electrical equipment

4.14 Electrical equipment should as far as is practicable be sited in a safe position remote from flammable liquid stores. Electrical equipment necessarily sited in hazardous areas (this may include components of the lighting and fire alarm systems), should be selected, installed and maintained in accordance with BS 5345 [15] .

Means of escape

4.15 The safety of persons using the store must be assured. Means of escape should be in accordance with the recommendations of the Home Office Guide[3] and escape routes must be kept clear of obstruction at all times.

4.16 The siting of the store should not prejudice the means of escape from other buildings.

Marking

4.17 Flammable liquid stores should be clearly and boldly marked to indicate the flammability of the contents. Where the store contains highly flammable liquids the store should be marked as required by the Regulations.

4.18 Other safety warning signs and notices should be used where appropriate and posted in prominent positions. In particular, the location of the key holder should be indicated and No Smoking and No Naked Flames notices should be displayed. Where appropriate, signs should be sited and designed in accordance with BS 5499: Part 1 [16] . All flammable liquid containers should themselves be labelled (see paragraph 2.5).

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Part 1: Code of practice for hydrant systems, hose reels and foam inlets.
Part 2: Code of practice for sprinkler systems.
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Printed in the United Kingdom for Her Majesty's Stationery Office
Dd289946 C46 10/87 3936 12521

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